

CLAIMS

1. An indicating desiccant comprising a silica-based material provided with, as the active indicator system, a source of iron and a source of bromide.
2. A desiccant as claimed in claim 1 which is essentially copper free.
3. A desiccant as claimed in claim 1 in which copper is present but in an amount which is less than 0.002% by weight with respect to the anhydrous silica-based material.
4. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount up to 2.0% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
5. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount of up to 1.0% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
6. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount of up to 0.6% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
7. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount of up to 0.45% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
8. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount of at least 0.01% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
9. A desiccant as claimed in any one of the preceding claims in which the source of iron is present in an amount of at least 0.02% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.
10. A desiccant as claimed in any one of Claims 1 to 3 in which the source of iron is present in an amount of 0.02 to 1.0% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.

11. A desiccant as claimed in any one of claims 1 to 3 in which the source of iron is present in an amount of 0.05 to 0.3% by weight, calculated as Fe with respect to weight of the anhydrous silica-based material.

12. A desiccant as claimed in any one of the preceding claims in which the bromine content is equal to, or greater than, the amount of iron.

13. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is at least 0.1 : 1.

14. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is at least 0.5: 1.

15. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is at least 1: 1.

16. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is up to 100: 1.

17. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is up to 50: 1.

18. A desiccant as claimed in any one of the preceding claims in which the source of bromide is present in an amount such that the weight ratio of Br to Fe is up to 20: 1.

19. A desiccant as claimed in any one of the preceding claims in which the bromide source comprises a water soluble salt.

20. A desiccant as claimed in any one of the preceding claims in which the bromide source is selected from one or more of the group consisting of alkali metal bromides, alkaline earth metal bromides, transition metal bromides and ammonium bromide.

21. A desiccant as claimed in any one of claims 1 to 19 in which the bromide source is selected from one or more of the group consisting of sodium bromide, potassium bromide, calcium bromide, magnesium bromide, zinc bromide and ammonium bromide.

22. A desiccant as claimed in any one of the preceding claims in which the source of iron is an iron(II) and/or an iron(III) salt or salts.
23. A desiccant as claimed in any one of the preceding claims in which the iron source is provided by one or more salts selected from the group consisting of iron(II) sulphate, iron(III) chloride, iron(III) nitrate, iron(III) sulphate, ammonium iron(II) sulphate, ammonium iron(III) sulphate and potassium iron(III) sulphate.
24. A desiccant as claimed in any one of the preceding claims in which the silica-based material is silica gel.
25. A desiccant as claimed in Claim 24 in which the silica gel is a beaded silica gel.
26. A desiccant as claimed in Claim 24 in which the silica gel is a granular silica gel.
27. A desiccant as claimed in Claim 24 in which the silica gel is a dry or humidified gel.
28. A desiccant as claimed in any one of claims 24 to 27 in which the silica gel has a pore volume to nitrogen in the range 0.2 to $2.0 \text{ cm}^3\text{g}^{-1}$ and a BET surface area in the range 200 to $1500 \text{ m}^2\text{g}^{-1}$.
29. A method of preparing an indicating desiccant comprising impregnating a silica-based material with a source of iron and a source of bromide to produce an essentially copper-free product in which the iron and bromide are the active indicators.
30. A method as claimed in claim 29 in which the source of iron is present in an amount up to 2.0 per cent by weight, calculated as Fe with respect to weight of the anhydrous silica-based material, and the source of bromide in an amount such that the weight ratio of Br to Fe is at least 0.1 : 1.
31. A method as claimed in claim 29 or 30 in which a humidified silica gel containing from 20 to 30 % by weight water is soaked in a solution containing from 0.1% to the saturation point of an iron salt and a source of bromide, excess solution is drained from the treated silica gel and the silica gel is dried at a temperature in the range 80° C to 230°C .
32. A method as claimed in claim 31 in which the gel is soaked in said solution for a period in the range of 2 to 24 hours.

33. A method as claimed in claim 30 in which impregnation is effected by mixing a humidified silica gel containing from 15 to 30 per cent moisture by weight with a solution containing a source of iron and a source of bromide, the amount of solution used being just sufficient to produce the required loading of iron and bromide on the silica gel, and subsequently drying the treated silica gel at a temperature in the range 80° C to 230° C.